

THE HONORABLE BARBARA J. ROTHSTEIN

UNITED STATES DISTRICT COURT  
WESTERN DISTRICT OF WASHINGTON  
AT SEATTLE

PACIFIC COAST FEDERATION OF )  
FISHERMEN'S ASSOCIATION; )  
INSTITUTE FOR FISHERIES )  
RESOURCES; OREGON NATURAL )  
RESOURCES COUNCIL; UMPQUA )  
WATERSHEDS, INC.; COAST RANGE )  
ASSOCIATION; and HEADWATERS, )  
Plaintiffs, )  
v. )  
NATIONAL MARINE FISHERIES )  
SERVICE, )  
Defendant. )

Civil No. C 99-0067 R  
DECLARATION OF  
GORDON REEVES, Ph.D.

I, Gordon Reeves, depose and say:

1. I am a fish and aquatic ecologist with expertise in the assessment of the impact of human activities and natural processes on aquatic ecosystems and the associated biota. I also have expertise in natural resource management, watershed restoration, and conservation biology of anadromous salmonids. I have a degree in Biology from the State University of New York, College at Oswego, a M.Sc. in fisheries science from Humboldt State University, and a Ph.D. in fisheries science from Oregon State University. I am currently a research fish biologist with the USDA

1 Forest Service, Pacific Northwest Research Station, Corvallis, OR. I have been  
2 employed in that capacity since 1985. A copy of my curriculum vitae is attached as  
3 Exhibit 1.

4 2. I have conducted extensive field research in watersheds on federal lands  
5 throughout western Oregon and southeast Alaska. I have published numerous  
6 peer-reviewed articles and book chapters on the ecology of anadromous salmonids,  
7 the impact of human activities and natural processes on their freshwater habitats,  
8 and watershed restorations. I was a member of the Panel on Late Successional  
9 Forests commissioned by the U.S. House of Representatives (a.k.a. The Gang of  
10 Four), the team that developed the PacFish recommendations for riparian areas on  
11 federal lands in the Pacific Northwest, Idaho, and Alaska, the Scientific Assessment  
12 Team (SAT), and co-leader of the Aquatic Team of the Forest Ecosystem  
13 Management Assessment Team (FEMAT) that developed the Aquatic Conservation  
14 Strategy (ACS) that was adopted as part of the Northwest Forest Plan (NWFP). I  
15 also assisted with the aquatic component of the Tongass Land Management Plan  
16 revision for southeast Alaska and the Interior Columbia Basin Assessment.

17 3. I have reviewed the brief of the Plaintiffs and the declaration of Dr. C.  
18 Frissell. I make the following statements based on my personal knowledge and  
19 experience.

20 The Aquatic Conservation Strategy - Components

21 4. The ACS articulated by the FEMAT (Exhibit 2; AR 15a) was designed to  
22 maintain currently properly functioning aquatic ecosystems and to restore degraded  
23 ecosystems. The ACS was designed to provide a scientific basis for protecting  
24 aquatic ecosystems and planning for sustainable resource management. It was  
25 based on strategies developed previously in the "Gang of Four", PacFish, and SAT.  
26

1 The ACS was more comprehensive than these earlier strategies. In the short term  
2 (i.e., 10-20 years), the ACS was designed to afford protection to watersheds that  
3 currently had good habitat and fish populations. The long-term goal (i.e., 100+  
4 years) was to develop watersheds that functioned properly ecologically and  
5 supported acceptable populations of fish and other aquatic and riparian dependent  
6 organisms across the region covered by NWFP.

7 5. The ACS has four major components: (1) key watersheds; (2) riparian  
8 reserves; (3) watershed analysis; and (4) watershed restoration. Each has a specific  
9 purpose. Key watersheds (V-46) were watersheds (5<sup>th</sup> to larger 6<sup>th</sup> field)<sup>1</sup> that either  
10 were: (1) considered to be ecologically intact and had favorable habitat for fish  
11 populations and other aquatic and riparian dependent organisms, or (2) were  
12 currently in a degraded states but were judged to have the greatest potential in the  
13 short term to be restored with an active watershed restoration program. These  
14 watersheds were distributed throughout the area covered by the NWFP. Key  
15 watersheds that were ecologically intact were assumed to have the best remaining  
16 fish habitats and populations and their protection was the short-term focus of the  
17 ACS. Populations in these watersheds would presumably provide sources of  
18 individuals to recolonize degraded watersheds as they recovered. Key watersheds  
19 that are currently degraded had less productive habitat for fish. Ecological  
20 processes that create and maintain habitat over time are altered in these systems.  
21 It was believed that these watersheds would recover relatively quickly under a  
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23 <sup>1</sup> FEMAT specified that aquatic ecosystems were of third to fifth order (Exhibit 2, V-  
24 13; AR 15a), and described the attributes of such systems. Since then, aquatic  
25 ecosystems are described as fields. The size of the watershed determinates the category.  
26 Third to fifth order watershed are now classified as fifth or sixth field depending on size.  
Fifth field ranges from 20-200 square miles and are referred to as watersheds. (Id.,  
Appendix V-I) Sixth field ranges from 2-50 square miles and are referred to as  
subwatersheds.

1 restoration focus and provide the best opportunities for population expansion in the  
2 short term. Management actions were precluded from all parts of key watersheds  
3 until a watershed analysis was completed in order to reduce the risk from  
4 management activities.

5 6. A riparian reserve (Exhibit 2, V-32; AR 15a) was the portion of the  
6 watershed that had direct influence on the aquatic ecosystem. This included the  
7 area around fish bearing and non-fish bearing streams. Riparian reserves provided  
8 the suite of ecological processes and functions required that influence the  
9 productivity and integrity of aquatic ecosystems. Activities in all riparian reserves  
10 were prohibited until a watershed analysis was completed.

11 7. Watershed analysis (Exhibit 2, V-53; AR 15a) was the procedure to  
12 identify and evaluate the geomorphic and ecological processes operating in a  
13 watershed. This formed the basis for planning and conducting activities within a  
14 watershed and evaluating their impacts. The size of the watershed was originally  
15 specified as 20-200 square miles, approximately a 5<sup>th</sup> field watershed. However,  
16 this size has not been strictly adhered to. Some 5<sup>th</sup> field watersheds were too  
17 large or too complex ecologically to be analyzed effectively. Watershed analysis, as  
18 a consequence, has been conducted in 5<sup>th</sup> field and aggregates of 6<sup>th</sup> field  
19 subwatersheds. The watershed analysis is supposed to guide planning that  
20 achieves the ACS within the watershed.

21 8. Watershed restoration (Exhibit 2, V-59; AR 15a) was intended to restore  
22 degraded ecosystems at the watershed scale. It was to be a comprehensive  
23 program that restored the ecological processes and functions that created and  
24 maintained habitat conditions for fish and other aquatic and riparian organisms.

1 9. The ACS objectives provide a framework for managing aquatic  
2 ecosystems primarily at watershed and landscape (i.e., multiple watershed) scales.  
3 They describe the attributes and distribution of aquatic ecosystems believed  
4 necessary to provide conditions for maintaining currently strong populations of fish  
5 and other aquatic and riparian dependent organisms and to recover currently  
6 degraded ecosystems. They are not intended to be a hard set of criteria that could  
7 or can be applied equally at all spatial scales of concern (i.e., site, watershed,  
8 province, and region).

#### 9 Ecosystem Dynamics and the Range of Variability

10 10. FEMAT emphasized the dynamic nature of aquatic ecosystems in the  
11 region of the NWFP and the need to maintain the processes that create and  
12 maintain habitat through time (Exhibit 2, V-28; AR 15a). Aquatic ecosystems in the  
13 NWFP region are dynamic as a result of the physical characteristics, natural  
14 disturbance events, and climatic features of the region [Naiman et al. 1992 (Exhibit  
15 3); Benda et al. 1997 (Exhibit 4)]. Watersheds in the NWFP region are generally  
16 in steep, mountainous terrain that is inherently unstable and receives large amounts  
17 of precipitation. Much of the region was historically subjected to periodic natural  
18 disturbances such as wildfire and large wind storms. The unstable terrain coupled  
19 with the stochastic nature of storm and disturbance events resulted in pulses of  
20 materials (i.e., sediment and wood) being delivered to stream channels.  
21 Consequently, there was a wide variation in conditions at the site and watershed  
22 scale over time (Naiman et al. 1992, Benda et al. 1997).

23 11. Understanding the implications of the focus on ecosystems and  
24 ecosystem dynamics that were emphasized by the FEMAT is required in order to  
25 understand how the ACS is to be applied at the various spatial scales. An  
26 important, but not well understood, implication of employing an ecosystem level

1 strategy based on disturbance is that all parts of a watershed or subwatershed or  
2 all subwatersheds may not be in "good" condition at every point in time [Naiman et  
3 al. 1992, Reeves et al. 1995 (Exhibit 5)]. As described in the previous paragraph,  
4 disturbance events, such as wildfire, landslides, and floods, maintained the  
5 long-term productivity of aquatic ecosystems in the area covered by the NWFP.  
6 These events would periodically deliver large amounts of materials (i.e., sediment  
7 and wood) to valley bottoms and streams, often resulting in periods of "degraded"  
8 conditions. Over time, several years to decades, systems would develop conditions  
9 more favorable to fish. As a result, the historic landscape, and watersheds within it,  
10 were a mosaic of patches of good habitat or subwatersheds in "good" condition  
11 interspersed with patches in less favorable conditions. Reeves et al. (1995)  
12 described the range of these conditions for streams in subwatersheds with little or  
13 no impacts from human activities in the sandstone geology of the central Oregon  
14 coast. Subwatersheds with degraded physical conditions supported fish  
15 communities with low diversity and biomass. These were characterized by channels  
16 with either deep deposits of gravel and few pieces of large wood or channels with  
17 bedrock and many pieces of large wood. In contrast, subwatersheds in good  
18 condition were those that had intermediate amounts of gravel, cobble, and large  
19 wood. These conditions supported a fish community that had a high diversity and  
20 biomass. Conditions within a subwatershed were not static but changed through  
21 time, much as vegetation did; systems that were in less productive conditions  
22 became more productive and productive systems may have become less  
23 productive. The result was a mosaic of conditions in watersheds and  
24 subwatersheds that shifted across the landscape with time. Reeves et al. (1995)  
25 argued that Pacific salmon (*Oncorhynchus* spp.) had life-history attributes that  
26 allowed them to persist in such an environment.

1 12. The ACS represents a major change in management of aquatic  
2 ecosystems. It requires consideration of large spatial (i.e., watershed to landscapes)  
3 and temporal scales (i.e.,  $\geq 100$  years) and of the dynamic processes operating in  
4 aquatic ecosystems in the area covered by the NWFP. The ACS is supposed to  
5 maintain aquatic ecosystems within the range of variability at the site<sup>2</sup> and small  
6 subwatershed scale and the larger subwatershed and watershed scale to provide  
7 for acceptable populations of anadromous salmonids and other targeted organisms.

8 13. At the site or smaller subwatershed the range of variability includes  
9 conditions that were immediately favorable to fish to those that were not very  
10 productive (Reeves et al. 1995, Benda et al. 1997). Such large variability in  
11 conditions at small spatial scales has been observed in terrestrial systems by  
12 researchers in coastal Oregon (Wimberly et al. in press) and other areas (Turner et  
13 al. 1993). Time from the last disturbance event determined the condition at the  
14 small subwatershed to a large extent. More recently disturbed sites or  
15 subwatersheds were less productive and those several years to decades away from  
16 disturbance were more favorable for fish. Variability in the pattern of conditions  
17 would be expected to differ among sites in a watershed based on geomorphology.  
18 Sites in unconstrained reaches (i.e., wide valley, low gradient sites of natural  
19 deposition) had a greater range of natural variability than did sites in constrained  
20 reaches (i.e., higher gradient, narrow valley reaches).

#### 21 Application of the ACS at Different Spatial Scales

22 14. Determining consistency with the ACS at the site or small subwatershed  
23 is not as simple as assuming that all sites or small subwatersheds need to be in  
24 "good" condition at all times and that any actions that may "degrade" a site or small  
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26 <sup>2</sup> The site ranges in size from 0.1 to 1 square mile (Exhibit 2, Appendix V-I; AR 15a).

1 subwatershed violates the ACS. As described in the previous paragraph, conditions  
2 at the small subwatershed may range from very favorable to unfavorable for fish  
3 over time. The ACS aims to allow for the expression of these variable conditions  
4 at a site or small subwatershed. However, it is not possible to evaluate consistency  
5 with the ACS at the sites scale by simply looking at the individual sites alone.

6 15. Consistency at the small subwatershed is determined by the range of  
7 variability established at the watershed or subwatershed. The range of variability  
8 at the watershed or sub watershed scale is the distribution of conditions of smaller  
9 subwatersheds that support acceptable populations of anadromous salmonids and  
10 other aquatic and riparian dependent organisms. It may be expressed as the  
11 frequency distribution of productive and non-productive sites and subwatersheds  
12 in a subwatershed or watershed, respectively (Benda et al. 1997). The ACS was  
13 designed to maintain and restore this variability or some desired range of variability  
14 similar to the natural range of watersheds that will support acceptable levels of fish  
15 populations.

16 16. Watershed analysis as proposed by FEMAT should identify this range  
17 of variability at the watershed level. This was then expected to guide management  
18 actions in the watershed and establish the criteria for determining consistency with  
19 the ACS at the watershed or subwatershed level. If the current distribution of  
20 conditions was determined to be within the acceptable range of variability for the  
21 watershed or subwatershed, then presumably sites are in compliance with the ACS.  
22 If the distribution of conditions was outside the acceptable range of variability then  
23 the watershed or subwatershed was out of compliance with the ACS. Management  
24 actions that would degrade a site or small subwatershed were not expected to  
25 proceed under such circumstances unless it was established that the actions would  
26 bring the system back within the acceptable level of variability in the long-term and

1 this outweighed any short-term negative impacts. Management activities are  
2 focused on restoration in such cases. The potential impact of the aggregate of  
3 proposed activities should be evaluated and the potential impact of this aggregate  
4 on the range of variability determined. Actions that alter the distribution outside of  
5 the desired range should be modified or eliminated.

6 17. The Riparian Reserve network was to provide opportunities for the  
7 ecological processes that create and maintain habitat through time to be expressed  
8 (e.g., delivery of wood sediment and water, input of nutrients, etc.). Management  
9 was to insure that Riparian Reserves continued to function properly. Watershed  
10 restoration was to restore the necessary ecological processes where they were lost  
11 or altered as a result of past management activities.

12 18. In summary, aquatic ecosystems in the range of the NWFP are dynamic  
13 and experience a wide range of conditions. All systems or parts of systems are not  
14 necessarily in good condition at every point in time. The ACS was designed to  
15 maintain this pattern so to provide for an acceptable number and distribution of  
16 watershed and subwatersheds that support acceptable populations of aquatic  
17 organisms. Determining consistency at the site scale requires understanding of the  
18 required range of variability established at the watershed/subwatershed scale. The  
19 presence of degraded conditions at individual sites or degraded subwatersheds can  
20 not be always be interpreted as failure to comply with the ACS.

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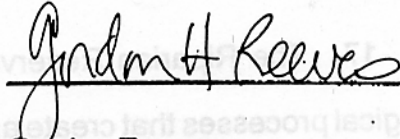
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DECLARATION OF GORDON REEVES - 9

Jean E. Williams  
Janice M. Schneider  
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Washington, D.C. 20044-7369

1 I declare under penalty of perjury that the foregoing is true and complete.

2 DATED this 27 day of May, 1999.

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9 Gordon Reeves

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DECLARATION OF GORDON REEVES - 11

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